CONTENTS

Preface xi

Part I. Invited papers plenary sessions

Few-body aspects of QCD and the internal structure of the nucleon
X.-D. Ji 1c

Few-body reactions in hadronic systems at low energies
L.D. Knutson 9c

Solar neutrinos: where we are, what we need
J. Bahcall 29c

Electroweak processes and the SAMPLE experiment
R.D. McKeown 42c

Chiral perturbation theory in few-body systems
U. van Kolck 56c

Quantum Monte Carlo calculations for light nuclei
R.B. Wiringa 70c

Stochastic variational methods in few-body systems
Y. Suzuki, K. Varga and J. Usukura 91c

A variational approach to three- and four-nucleon systems
M. Viviani 111c

Few-nucleon physics with stored, cooled beams
H.O. Meyer 122c

Role of relativity in few-body systems
S.J. Wallace 137c

Relativistic effects in the three-nucleon problem
A. Stadler 152c

Effective neutron targets
H. Gao 170c

Spin-dependent electromagnetic response of few-body systems
M. Ferro-Luzzi, R. Alarcon, T. Bauer, D. Boersma, T. Botto, M. Bouwhuis, J.F.J. van den Brand, H.J. Bulten, L. van Buuren, R. Ent, D. Geurts, M. Harvey, P. Heimberg, D. Highinbotham, C.W. de Jager, J. Lang, D.J. de Lange, B. Norum, I. Passchier, H.R. Poolman, M. van der Putte, E. Six, J. Steijger, D. Szczerba, O. Unal, H. de Vries and Z.-L. Zhou 190c

Photodisintegration of three- and four-nucleon systems
W. Sandhas, W. Schadow, G. Ellerkmann, L.L. Howell and S.A. Sofianos 210c

Photo-nuclear reactions on few body systems
G. Anton 230c

Results of recent bremsstrahlung measurements on few-body systems at KVI
N. Kalantar-Nayestanaki 242c

Strangeness production at COSY
D. Grzonka 262c

New observables in $^2H(e, e'p)n$
S. Gilad, W. Bertozzi and Z.-L. Zhou 276c

Deuteron structure functions in the context of few-body physics
A.W. Thomas and W. Melnitchouk 296c

Few-body aspects of non-perturbative QCD
H.G. Dosch 316c

Experimental studies of threshold meson production at CELCIUS
T. Johansson 331c

Low-energy pion–nucleon interaction
R.G.E. Timmermans 343c

Precision XUV laser spectroscopy of atomic and molecular two-electron systems
W. Hogervorst, K.S.E. Eikema, E. Reinhold and W. Ubachs 353c

Few-body hypernuclear systems
T. Nagae 363c

Halo states in nuclei
B. Jonson 376c

Recent results from Jefferson Lab
R. Ent 385c

Part II. Selected contributions parallel sessions

Nucleon–nucleon interaction

The NN interaction
B.F. Gibson 409c

Spin transfer coefficients for pp elastic scattering at 200 MeV; Implications for the πNN coupling constant
S.W. Wissink 411c

Measurements of np scattering at 96 and 162 MeV
N. Olsson, J. Rahm, J. Blomgren, H. Condé, S. Dangtip, K. Elmgren, O. Jonsson, L. Nilsson, P.-U. Renberg, A. Ringbom, T. Rönnqvist, G. Tibell and R. Zorro 416c

Scattering length measurements from radiative pion capture and neutron–deuteron breakup
W. Tornow, T.S. Carman, Q. Chen, W.R. Gibbs, B.F. Gibson, D.E. González Trotter, C.R. Howell, A.H. Hussein, G. Mertens, C.F. Moore, C.

Morris, A. Obst, E. Pasyuk, C.D. Roper, F. Salinas, D. Schmidt, H.R. Setze, I. Slaus, S. Sterbenz, H. Tang, R.L. Walter, C.R. Whiteley, H. Witała and Z. Zhou 421c

Excitation functions of proton–proton elastic scattering at intermediate energies
W. Scobel and F. Dohrmann (EDDA Collaboration) 426c

Impact of recent NN data on partial wave analyses
M. Rentmeester 431c

The Hiroshima phase-shift analysis
M. Matsuda 436c

Proton–proton scattering at 90° for P_{lab} up to 12 GeV / c
B. Loiseau and W.R. Gibbs 442c

Regularization and renormalization in effective field theories of the nucleon–nucleon interaction
D.R. Phillips, S.R. Beane and T.D. Cohen 447c

NN potential from chiral SU(3) Lagrangian
V.G.J. Stoks and Th.A. Rijken 452c

New version of Moscow NN model
V.I. Kukulin and V.N. Pomerantsev 456c

Quark model approach to the charge dependent N–N interaction
F. Wang, P. Xu, J.-L. Ping and D. Qing 462c

Hadronic structure and quantum chromodynamics

Light and strange baryons in a chiral quark model with Goldstone-boson-exchange interactions
L.Ya. Glozman, W. Plessas, K. Varga and R.F. Wagenbrunn 469c

Description of baryons in the relativistic Faddeev approach to the NJL model
W. Bentz, N. Ishii, H. Asami and K. Yazaki 473c

Probing nucleon strangeness using vector meson dominance
S.R. Cotanch and R.A. Williams 478c

Meson substructure and the ρNN and ωNN couplings
P.C. Tandy, L. Qian and S. Banerjee 482c

Isospin symmetry breakings as from QCD sum rules
W.Y. Pauchy Hwang 487c

Quark contribution to charge-dependent NN interaction
C.W. Kao and S.N. Yang 492c

Problems with conventional sum rule analyses for the light quark masses and a new analysis of m_s
K. Maltman, R. Gupta and T. Bhattacharya 497c

Feynman diagram approach to high-energy scattering from lightest nuclei
L. Frankfurt, G. Piller, M. Sargsian and M. Strikman 502c

Measurements of the neutron spin structure functions using the SLAC 50 GeV fixed target facility and a polarized ^{3}He target
G.G. Petratos 507c

Mesonic degrees of freedom

Threshold pion production in nucleon–nucleon collisions
C. Hanhart, J. Haidenbauer and J. Speth 515c

Pion absorption reaction on ^{2}H and ^{3}He in the Δ-isobar region
H. Kamada, M.P. Locher, T.-S.H. Lee, J. Golak, V.E. Markushin, W. Glöckle and H. Witała 519c

Polarization transfer observables in πd elastic scattering
W. Kretschmer, A. Glombik, G. Suft, R. Weidmann, E. Boschitz, B. Brinkmöller, R. Meier, B. van den Brandt, P. Hautle, J.A. Konter, S. Mango, R. Tacik, P. Amaudruz, C. Riedel and W. Grüebler 524c

Deuteron wave functions, πN off-shell behavior and πd polarization observables
L. Mathelitsch and H. Garcilazo 529c

A relativistic dynamical model of πN scattering
V. Pascalutsa and J.A. Tjon 534c

Elastic $\pi\pi$ scattering up to 2 GeV and the meson resonance spectrum
W.M. Kloet and B. Loiseau 538c

Exclusive near threshold two-pion production with the MOMO experiment at COSY
S. Bavink, F. Bellemann, A. Berg, J. Bisplinghoff, G. Bohlscheid, J. Ernst, C. Henrich, F. Hinterberger, R. Ibald, R. Jahn, L. Jarczyk, R. Joosten, A. Kozela, H. Machner, A. Magiera, R. Maschuw, T. Mayer-Kuckuk, G. Mertler, J. Munkel, P. v. Neumann-Cosel, D. Rosendaal, P. v. Rossen, H. Schnitker, K. Scho, J. Smyrski, A. Strzalkowski, R. Tölle and R. Wurzinger 542c

Coherent π^0 electroproduction on ^{4}He in the Δ region
M.J.M. van Sambeek, T. Botto, T. Bauer, H.P. Blok, D. Boersma, G.E. Dodge, D. Groep, P. Heimberg, W.H.A. Hesselink, D.W. Higinbotham, C.W. de Jager, E. Jans, T.J. Ketel, D.J.J. de Lange, L. Lapikás, B.E. Norum, I. Passchier, V.M. Pugatch, M.F.M. Steenbakkers, J.J.M. Steijger, L. Todor, P. Ulmer, H. de Vries and K. Wang 545c

Relativity and field theory

Covariant solutions of the Bethe–Salpeter equation and an application to the nucleon structure function
A.G. Williams 553c

Gauging hadronic systems
A.N. Kvinikhidze and B. Blankleider 559c

Relativistic Quantum Field Theory (RQFT) treatment of few-body systems
A.V. Shebeko and M.I. Shirokov 564c

Relativistic dynamics in $pp \to pp\pi^0$ near threshold
J. Adam Jr., A. Stadler, M.T. Peña and F. Gross 570c

Pairs in the light-front and covariance
J.P.B.C. de Melo, J.H.O. Sales, T. Frederico and P.U. Sauer 574c

Electromagnetic probes of few-body systems

Explicit pionic degrees of freedom in deuteron photodisintegration in the Δ-resonance region
M. Schwamb, H. Arenhövel, P. Wilhelm and Th. Wilbois 583c

Triton photodisintegration with realistic potentials
W. Schadow and W. Sandhas 588c

The $^4He(e, e'p)$ cross section at large missing energy
J.J. van Leeuwe, H.P. Blok, J.F.J. van den Brand, H.J. Bulten, G.E. Dodge, R. Ent, W.H.A. Hesselink, E. Jans, W.J. Kasdorp, J.M. Laget, L. Lapikás, C.J.G. Onderwater, A.R. Pellegrino, C.M. Spaltro, J.J.M. Steijger, J.A. Templon and O. Unal 593c

Can neutron electromagnetic form factors be obtained by polarized inclusive electron scattering off polarized three-nucleon bound states?
A. Kievsky, M. Viviani, E. Pace and G. Salmè 597c

Spectator scaling in semi-inclusive inelastic lepton scattering off the deuteron and the neutron structure function
S. Simula 602c

Generalized polarizabilities and the chiral structure of the nucleon
T.R. Hemmert, B.R. Holstein, G. Knöchlein and S. Scherer 607c

On the Gerasimov–Drell–Hearn sum rule for the deuteron
H. Arenhövel, G. Kreß, R. Schmidt and P. Wilhelm 612c

Measurements of the virtual bremsstrahlung yields in the p + p system
J.G. Messchendorp, J.C.S. Bacelar, J.A. Fülöp, M.J. van Goethem, M.N. Harakeh, M. Hoefman, H. Huisman, N. Kalantar-Nayestanaki, H. Löhner, R.W. Ostendorf, S. Schadmand, R. Turrisi, M. Volkerts, H.W. Wilschut, A. van der Woude, R. Holzmann, R. Simon, A. Kugler, K. Tcherkashenko and V. Wagner 618c

Proton–proton bremsstrahlung at 310 MeV
J. Zlomanczuk and A. Johansson (WASA-PROMICE Collaboration) 622c

Polarized radiative capture studies of the 3-body system below 80 keV
H.R. Weller 627c

Computational methods

Variational treatment of quenched QED using the worldline technique
A.W. Schreiber, C. Alexandrou and R. Rosenfelder 635c

QCD hamiltonian approach for the glueball spectrum
S.R. Cotanch, A.P. Szczepaniak, E.S. Swanson and C.-R. Ji 640c

Treatment of the two electron problem in strong magnetic fields by a combination of the finite element and hyperspherical close coupling methods
M. Braun, W. Schweizer and H. Elster 644c

High-accuracy 3-body coupled-channel calculation of metastable states of antiprotonic helium atoms
Y. Kino, M. Kamimura and H. Kudo 649c

Scattering states in the four nucleons system
F. Ciesielski, J. Carbonell and C. Gignoux 653c

Method of integral transforms for calculating few-body reactions
V.D. Efros, W. Leidemann and G. Orlandini 658c

Recent progress in the 3N system including three-nucleon forces
D. Hüber, H. Witała, H. Kamada, A. Nogga and W. Glöckle 663c

Variational study of 3N scattering
A. Kievsky 668c

Baryonic bound states and reactions

Microscopic calculation of four-nucleon scattering observables in $dd \rightarrow dd$ and $dd \rightarrow p^3H$
A.C. Fonseca 675c

An energy-dependent phase shift analysis of low-energy proton–deuteron elastic scattering
T.-C. Black, H.-J. Karwowski, E.-J. Ludwig, A. Kievsky, S. Rosati and M. Viviani 680c

Possible origin of Sagara discrepancy in the cross section minimum of p–d elastic scattering
Y. Koike and S. Ishikawa 683c

Proton induced deuteron breakup reaction at 65 MeV: unspecific configurations
K. Bodek, W. Glöckle, J. Golak, L. Jarczyk, St. Kistryn, B. Kozłowska, J. Lang, A. Micherdzińska, O. Naviliat-Cuncic, J. Smyrski, M. Sokołowski, J. Sromicki, A. Strzałkowski, H. Witała, J. Zejma and W. Zipper 687c

Implications of the space-star anomaly in nd breakup
C.R. Howell, H.R. Setze, W. Tornow, R.T. Braun, W. Glöckle, A.H. Hussein, J.M. Lambert, G. Mertens, C.D. Roper, F. Salinas, I. Šlaus, D.E. González Trotter, B. Vlahović, R.L. Walter and H. Witała 692c

Precise experiment on $\vec{n} + d$ scattering at 12 MeV
N. Nishimori, K. Sagara, T. Fujita, F. Wakamatsu, T. Bussaki, K. Maeda, H. Akiyoshi, K. Tsuruta, H. Nakamura and T. Nakashima 697c

Proton–deuteron phase-shift analysis above the deuteron breakup threshold
W. Tornow and H. Witała 701c

Atomic and molecular systems

Energetic collisions of charged projectiles with atomic bound states
E.O. Alt, A.S. Kadyrov and A.M. Mukhamedzhanov 709c

Positron–helium scattering: Resonance and differential cross sections
P. Chaudhuri and S.K. Adhikari 715c

Nuclear fusion via triple collisions in solar plasma
V.B. Belyaev, D.E. Monakhov, N. Shevchenko, S.A. Sofianos, S.A. Rakityansky, M. Braun, L.L. Howell and W. Sandhas 720c

On electron induced ionization of hydrogen
C. Chandler and A.G. Gibson 723c

Spectrum generating algebra of the symmetric top
R. Bijker and A. Leviatan 727c

Weak interactions

Radiative and non radiative muon capture on the proton in heavy baryon chiral perturbation theory
H.W. Fearing, R. Lewis, N. Mobed and S. Scherer 735c

The nonmesonic weak decay of the hypertriton
J. Golak, K. Miyagawa, H. Kamada, H. Witała, W. Glöckle, A. Parreño, A. Ramos and C. Bennhold 740c

Polarization degrees of freedom in hadronic reactions

Measurement of tensor polarization observables in the $H(\vec{p}, \vec{d})\pi^+$ reaction between 580 and 1300 MeV
C. Furget, J. Goy, S. Kox, A. Pastor, J.S. Real, J. Arvieux, E.J. Beise, L. Bimbot, E. Brash, H. Breuer, G. Collins, F. Duncan, J.E. Ducret, M. Garçon, R. Gilman, C. Glashausser, V.P. Ladygin, M. Morlet, F. Merchez, P. Rutt, E. Tomasi-Gustaffsson and E. Voutier 747c

Measurement of a complete set of spin observables in the $^2H(p, n)2p$ reaction at 200 MeV
B.D. Anderson, D.L. Prout, M. Palarczyk, A. Ahmidouch, A.R. Baldwin, D. Cooper, C.C. Foster, W. Glöckle, M.S. Islam, C. Hautala, K. Hicks, M. Khayat, B. Luther, R. Madey, D.M. Manley, I. Niculescu, J. Rapaport, G. Savopulos, J. Sowinski, E.R. Sugarbaker, R. Suleiman, I. Van Heerden, J.W. Watson, H. Witała, X. Yang and W.M. Zhang 752c

Cross sections and complete polarization transfer measurements for the $^2H(\vec{p}, \vec{n})pp$ reaction at 346 MeV
H. Sakai, T. Wakasa, T. Nonaka, H. Okamura, H. Otsu, S. Fujita, S. Ishida, N. Sakamoto, T. Uesaka, Y. Satou, T. Ohnishi, G. Yokoyama, M. Ichimura, M.B. Greenfield and K. Hatanaka 757c

Strangeness and antiparticles

Photoproduction of the hypertriton
T. Mart, D. Kusno, C. Bennhold, L. Tiator and D. Drechsel 765c

Theoretical analysis of the $^4He(K^-, \pi^\mp)$ spectrum
T. Harada 771c

The $\Lambda\Lambda$ interaction and the reaction $\Xi^- + d \to n + \Lambda + \Lambda$
S.B. Carr, I.R. Afnan and B.F. Gibson 776c

Systems with mass A ⩾ 4

S-matrix studies of resonances in A = 3, 4, 5, 6, and 12 nucleon systems
A. Csótó and G.M. Hale 783c

Asymptotic normalization coefficients and astrophysical radiative capture reactions
A.M. Mukhamedzhanov, H.L. Clark, H. Dejbakhsh, C.A. Gagliardi, Y.-W. Lui, L. Trache, R.E. Tribble, H.M. Xu, V. Burjan, J. Cejpek, V. Kroha, S. Piskor, J. Vincour, F. Carstoiu and A. Sattarov 788c

Computations of the three-body continuum spectrum of ^{6}He
A. Cobis, D.V. Fedorov and A.S. Jensen 793c

List of Participants 799c

Author Index 809c